EFFECTIVENESS OF RDI BASED OCCUPATIONAL THERAPY INTERVENTION FOR CHILDREN WITH AUTISM

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CERTIFICATE

This is to certify that the research work entitled **"EFFECTIVENESS OF RDI BASED OCCUPATIONAL THERAPY INTERVENTION FOR CHILDREN WITH AUTISM"** was carried out by **Reg.No. 41101051,** KMCH College of Occupational Therapy, towards partial fulfillment of the requirements of Master of Occupational Therapy (Advanced OT in Pediatrics) of the Tamilnadu Dr. M.G.R. Medical University, Chennai.

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ABSTRACT

OBJECTIVE:

- To find out the effectiveness of RDI based OT intervention in improving social interaction and communication for children with autism.

DESIGN:

- Pre-test – post-test quasi experimental design.

STUDY SETTING:

- The study was conducted in the Occupational Therapy Department of KMCH, Coimbatore.

PARTICIPANTS:

- Purposive judgment sampling technique was used and children with autism were recruited if they satisfied the selection criteria.

METHOD:

- The participants were divided into experimental and control groups. Following the base-line evaluation on GARS-2, the children in the experimental group received RDI based OT intervention in addition to the conventional therapy, while the control group received only conventional therapy. The experimental intervention lasted for 2 to 3 months. The outcome measure was done, after the sessions for both the groups.

RESULTS:

- The children in the experimental group showed significant improvements in the social interaction and communication skills. And also there was significant reduction of the stereotypical behaviors while comparing the descriptive statistics. The analysis showed

that there is reduction in the severity of the symptoms for the children in the experimental group.

CONCLUSION:

- The current study had proved that RDI based OT intervention is effective in improving the social interaction and communication skills for children with autism and it can be used as an adjunct to the conventional therapy. Thus, the results encourage occupational therapists to use RDI as an adjunct intervention in a holistic approach.

INTRODUCTION

In early life careful nurturing of the ***parent – child relationship*** is essential to successful personal and social development. Throughout the childhood a major effort needs to be made to ensure that the child participates fully in all the customary experiences of childhood – family events, playground activities, games, music, drama, parties and so forth.

Plum (1981) and ***Yardley (1979***) have iterated that social skills are unique in that only the people involved in interpersonal interaction understand the real meaning of that interaction.

Yardley (1979) put forward that social skills are not goal – directed but individuals could verbalize their goals during social – interaction and it is often valued in its own right rather than as a means to an end. Social interaction involves other people whereas many other skills, such as operating a machine, do not.

The setting of appropriate social expectations and the concomitant rewarding of appropriate and punishing of inappropriate social behaviors are critical to the child's success but are frequently difficult to determine. Within a carefully planned structure of opportunities and experiences, the child also needs sufficient freedom to explore and discover in order to obtain personal and social competence.

According to Rebecca Landa (2007), communication is a broad concept, encompassing linguistic, paralinguistic and pragmatic aspects of functioning. Early social and communication development are intimately intervened. In typical development, infants are heavily influenced by others joint attention cues and are more likely to associate a new word to an object if the speaker is looking at that object than if his/ her attention is not directed to that object [Baldwin et al., (1991) and Woodward (2003)].

Autism is a pervasive developmental disorder, which shows ***qualitative impairments in social interactions, imaginative activity and both verbal and non – verbal communication skills***. Children with autism tend to have limited interests and activities and

these are ritualized and stereotypic. They have a desire to maintain sameness in their routine and surroundings. Symptoms appear within the first three years of life (Kabat, Masi & Segal, 2003).

According to Peter Hobson, autism is the "***developmental outcome of profound disruption in the usual patterns of inter-subjective co–ordination between the affected individual and others"*** (Hobson & Bishop, 2003). His theory of inter-subjectivity, suggests that without emotional involvement with other people, the whole of mental development is terribly compromised.

Therefore, according to ***Gerald Mahoney et al., (2005), relationship – focused (RF) early intervention*** addresses the social-emotional and developmental needs of young children by encouraging parents to use strategies that are designed to help them interact more responsively with their children. Thus, this specifies the need of adjunct intervention along with the conventional treatment for autism.

Relationship Development Intervention (RDI) is the first systematic intervention program designed by ***Dr. Steven Gutstein***, specifically to help children born with obstacles that prevent them from attaining relationship competence in the natural environment. It is based on the premise that relationships are self – motivating, ends in themselves. In this intervention, the therapists work hard to provide children with samples of potential payoffs in enjoyment and positive excitement they can obtain from social encounters. ***Barry. K. Morris (2005),*** in a study specified, as with many interventions more research is required to establish RDI as a fully qualified evidence – based treatment and the research suggests that it should be considered as an adjunct to other interventions which have been established as effective (Perry & Condillac, 2003).

Henceforth, the investigator had framed the research questions as,

- Can RDI based OT intervention be used along with the conventional treatment in treating children with autism?
- Will this intervention prove to be effective in improving the social interaction and communication skills for children with autism?

OPERATIONAL DEFINITIONS

EFFECTIVENESS:

Effectiveness is the extent to which an activity fulfils its intended purpose or function. Wojtczak (2002) defines effectiveness as a measure of the extent to which a specific intervention, procedure, regimen, or service, when deployed in the field in routine circumstances, does what it is intended to do for a specified population. In the health field, it is a measure of output from those health services that contribute towards reducing the dimension of a problem or improving an unsatisfactory situation.

RDI BASED OT INTERVENTION:

Using the guidance, principles and techniques specified by ***RDI (Relationship Development Intervention)***, OT intervention is framed according to the subject's level of performance. Theoretical ***play – way method*** is used to structure the frame work of intervention.

SOCIAL INTERACTION:

It is the process in which people act toward or respond to others. Human interaction is mediated by the use of symbols, by interpretation, by ascertaining the meaning of one another's actions. (Stimulus and response in the case of human behavior).

COMMUNICATION:

The definition of communication is shared in the Webster's Dictionary as "sending, giving, or exchanging information and ideas," which is often expressed nonverbally and verbally. ***Non-verbal communication*** is the act of speaking without using words. ***Verbal communication*** is the act of speaking by using words.

AIMS AND OBJECTIVES

AIM:

- To assess the ***effectiveness of RDI based occupational therapy intervention in improving social interaction and communication skills*** for children with autism.

OBJECTIVES:

- To educate parents on autism and principles of RDI based OT intervention.
- To intervene children with RDI based OT intervention along with parents as co-therapist.
- To determine the impact of intervention on social interaction and communication.

HYPOTHESIS

Alternate Hypothesis:

- RDI based OT intervention will have effect in improving social intervention and communication for children with autism.

Null Hypothesis:

- RDI based OT intervention will not have effect in improving social interaction and communication for children with autism.

RELATED LITERATURE

Autism is a severe form of a group of disorders termed pervasive developmental disorders termed pervasive development disorders (PDDs) (Bauer 1995; Frith 1993). PDDs are characterized by impairments in social relatedness and communication skills and by the presence of unusual activities and interests such as rituals, stereotypes and poor play skills.

Dr. Leo Kanner, a child psychiatrist, published the first description of what he called "autistic disturbance of affective contact." Kanner believed that children with autism have ***"an inability to relate themselves in the ordinary way to people and situations from the beginning of life."***

Defining Autistic Disorder:

A. In order to diagnose autistic disorder, a child must have onset of symptoms prior to 3 years of age and meet 6 to 12 criteria listed in the **DSM – IV (APA, 1994).**

- Qualitative impairment in ***social interaction:***
  - Marked impairment in the use of multiple nonverbal behaviors such as eye-to-eye gaze, facial expression, body postures and gestures to regulate social interaction
  - Failure to develop peer relationships appropriate to developmental level
  - A lack of spontaneous seeking to share enjoyment, interests or achievements with other people (e.g. by a lack of showing, bringing or pointing out objects of interest to other people)
  - Lack of social or emotional reciprocity
- Qualitative impairments in ***communication:***
  - Delay in, or total lack of, the development of spoken language (not accompanied by an attempt to compensate through alternative modes of communication such as gestures or mime)
  - In individuals with adequate speech, marked impairment in the ability to initiate or sustain a conversation with others
  - Stereotyped and repetitive use of language

- Lack of varied spontaneous make believe play or social imitative play appropriate to development level

- ***Restricted repetitive and stereotyped patterns*** of behavior, interests and activities
  - Encompassing preoccupation with one or more stereotyped and restricted patterns of interest that is abnormal either in intensity or focus
  - Apparently inflexible adherence to specific, nonfunctional routines or rituals
  - Stereotyped and repetitive motor mannerisms (e.g. hand or finger flapping or twisting, or complex whole body movements)
  - Persistent preoccupation with parts of objects

B. Delays or abnormal functioning in one of the following areas, with onset before age 3: (1) social interaction, (2) language as used in social communication or (3) symbolic or imaginative play.

C. This disturbance is not better accounted for by Rett's syndrome or childhood disintegrative disorder.

Prevalence and origin of PDD:

Autistic disorder occurs in **10 per 10000** live births. The recurrence risk of autism in subsequent pregnancies ranged from 2% to 9% (Ritvo et al.,). A 2009 study of California data reported the incidence of autism rose 7 – 8 fold from early 1990's to 2007. Boys are at greater risk. **Male: female** averages **4.3:1.**

Etiology of autism:

Current research has demonstrated the etiology of autism as an organic impairment.

Psychogenesis basis:

Leo Kanner described nature and nurture controversy, heredity and environment. Francis Tustin gave a psychodynamic point of view for the etiology. Tustin refers, in her book autism and childhood psychosis (1973) that early infant stage as normal primary autism which prolongs to result as pathologic autism.

There are certain **genetic cause** and **environmental causes** such as childhood vaccines, excessive use of oral antibiotics, maternal exposure to mercury, lack of essential minerals and other environmental toxins.

Associated features and behaviors:

- **Cognitive function:**
  - Autism occurs at all intelligence level. 75% have below I.Q. and 25% have an above average I.Q.
  - Performance I.Q. is higher than verbal I.Q.
  - Small % of children have higher I.Q. in specific areas
- **Neurologic function:**
  - 25% to 35% of children with autism develop seizures
- **Behavioral symptoms:**
  - Aggressive or self injurious behavior
  - Noticeable extreme under or over-activity
  - Throwing tantrums
  - Short attention span
  - Abnormal responses to sensory stimuli
  - Abnormalities in eating or sleeping
  - Not responding to normal teaching methods
  - Having no apparent fear of dangerous situations
- **Mood and affect:**
  - Varies considerably
  - Withdrawn or emotionally labile
  - Outwardly anxious
  - Affection may be indiscriminate

Co – morbid conditions:

- **Genetic disorders:** About 10-15% of autism cases have an identifiable single gene condition.
- **Mental retardation:** The fraction autistic case having MR falls around 25% to 70%. This variation illustrates the difficulty of assessing autistic intelligence.
- **Anxiety disorders:** symptoms include generalized anxiety, separation anxiety, and social phobia. Prevalence reported to be around 11% and 84%
- **Epilepsy:** 5 to 38% prevalence in childhood and 16% remission in adulthood. Affects cognitive level and language problems
- Metabolic defects such as phenyl-ketonuria, minor physical anomalies.

Diagnosis:

- No lab test or X-ray can confirm the diagnosis
- Based on clinical judgment and early onset of symptoms

  According to ***National Institute of Child Health and Human Development (NICHD)***, experts recommend that babies should be evaluated for autism who has not met the following developmental milestones.
  - Not babbled or cooed by age / year
  - Not gestured, pointed or waved as an infant
  - Not spoken a single word by age 16 months
  - Not spoken a 2 word phrase by 2 years
  - Experiences any loss of language or social skills at any age.

Tools used to help identify young children with ASD:

- Autism Behavior Checklist (ABC)
- Autism Diagnostic Interview – Revised (ADI-R)
- Autism Diagnostic Observation Schedule (ADOS)
- Checklist for Autism in Toddlers (CHAT)
- Childhood Autism Rating Scale (CARS)

- Detection of Autism by Infant Sociability Interview (DAISI)
- Gilliam Autism Rating Scale (GARS)
- Screening Tool for Autism in Two Year Olds (STAT)

Management:

Medical Management:

Medications do not treat the underlying neurologic problems associated with autism.

Stereotypical, self-injurious and aggressive behavior:

- Buspirone, Carbamazepine, clomipramine, Clonidine, Fluvoxamine, Guanfacine, Haloperidol, Naltrexone, Propranolol, Risperidone.

Hyperactivity, short attention span or impulsivity – Dextroamphetamine, Ritalin

Other Approaches:

- ***Applied Behavior Analysis (ABA):***

  Many different behavioral interventions have been developed for children with autism. This approach generally involves therapists' one-to-one interaction with child for at least 20 to 40 hours / week. Skills are taught in step by step manner. Structured, formal sessions are formed. ABA is effective when started early even before 5 years of age but useful in older children.

- ***Sensory Integration:***

  Autistic individuals with sensory problems can range from mild to severe. They involve either hypo or hypersensitivity to stimuli. Sensory integration focuses mainly on three senses – vestibular, tactile and proprioception. Techniques are used to stimulate these senses in order to normalize them.

- ***Occupational Therapy:***

  As an important part of the team, Occupational therapists work in making the children independent in all possible functional areas and plan out intervention in a holistic manner.

- ***Speech therapy:***

It benefits children when 1-2 hours sessions / week are taken. Sign language and PECS has been found beneficial in developing speech.

- ***Psychotherapy:***

  Education regarding child's condition and the need of parenting is emphasized to the parents through this kind of parent education program.

- Other techniques such as Auditory Interventions and Vision Training and Irlen lenses are used as adjuncts.

- ***Relationship Development Intervention (RDI):***

  This is a new method of orienting children how to develop relationships first with their parents and later with their peers. It directly addresses the core issues in autism.

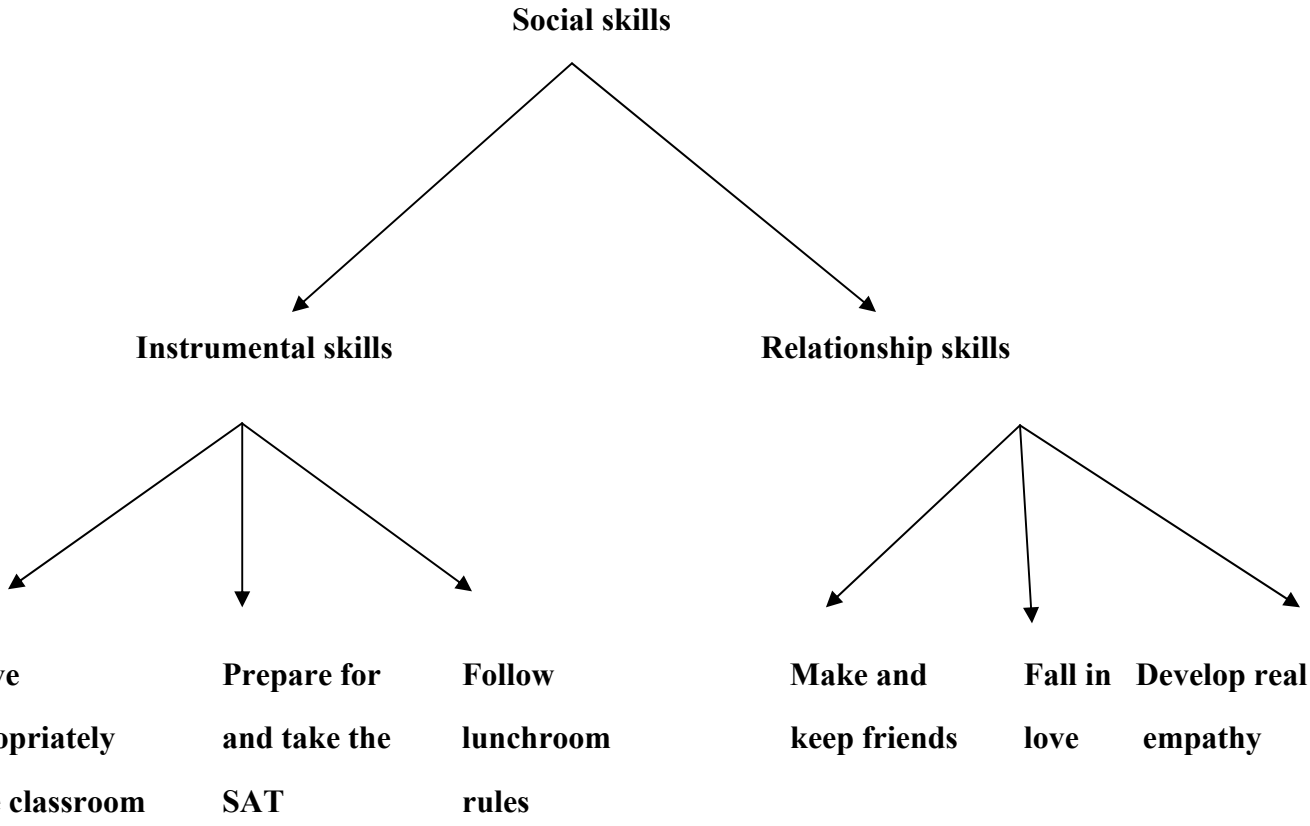
Future Plans:

- Individualized educational program helps in developing educational skills
- State services given by the Government helps in maintaining full functional independence throughout life and benefits them with all therapy programs.

RELATINSHIP DEVOLOPMENT INTERVENTION:

Authors have reviewed **25** years of developmental psychology in preparing the innovative intervention. Skill areas of maintaining friendships are- Enjoyment, Referencing, Reciprocity, Repair, Co-creation, We-go, Social memories, Maintenance, Alliance and Acceptance. These are essential relationship skills.

The table of social skills is specifically mounted to have proper relationship.



"Instrumental skills" does not head to success in friendship and other relationships.

"Relationship skills" head to the ability to have friends an intimate relationship. They are helpful to create and deepen connections between people, share excitement and joy participate in joint creative efforts, flexibility and creative thinking. Thus these two types of skills require very different learning methods. This fundamental difference developed RDI.

Relationship skills must first be learned and mastered in simple environments. In RDI, the first relationship coaches should be adults who are guides and participants. That's why **LEV VYGOTSKY** termed ***"Guided participation"***.

Relationship competence requires a careful, systematic layering of skills. They must be taught with increasing complexity carefully added. Each step we take in constructing relationship competence, serves as the scaffolding for the next step in a carefully crafted manner.

Relationship Development Intervention (RDI) is the first systematic intervention program designed specifically to help children born with obstacles in attaining relationship competence in the environment. It is a parent centered intervention focused on remediating the core deficits of autism spectrum disorders and related disabilities.

Dr.Steven Gutstein, PhD, a clinical psychologist developed the intervention upon being dissatisfied with other therapies. He served as an Assistant Professor of Psychiatry and Pediatrics at ***Bayler College of Medicine and the University Of Texas Medical School***. He was the director of Pediatric Psychology for Texas children's hospital. Currently, he is the director of the connection center, which is the centre for RDI.

CORE-DEFICIT OF AUTISM ACCORDING TO RDI:

The deficits are all related to the personals deficit in processing ***"dynamic"*** information-information related to change. The brain of persons with autism are ***"wired"*** that they have more of a tendency to process information, therefore they respond ***"static"*** way. This deficit in dynamic processing includes problems with social relationship, problems with transitions, inability to appraise situations.

STATIC INTELLIGENCE: The ability to know information or memorize facts.

DYNAMIC INTELLIGENCE: The ability to flexibly and creatively respond to novel situations.

Activities have **6** shared deficits.

EMOTIONAL REFERENCING: Ability to use an emotional feedback system to learn from the subjective experience of others.

SOCIAL CO-ORDINATION: Ability to observe and continually regulate ones behavior in order to participate in spontaneous relationships involving collaboration and exchange of emotions.

DECLARATIVE LANGUAGE: Using language and non verbal communication to express curiosity and feelings.

FLEXIBLE THINKING: Ability to rapidly adapts, change strategies and after plans based upon changing circumstances.

RELATIONAL INFORMATION PROCESSING: Ability to reflect on past experiences and anticipate potential future scenarios in a productive manner.

DIFFERENCE BETWEEN ABA AND RDI:

ABA (applied behavior analysis) is a teaching strategy with the goal of shaping appropriate behavior, teaching socially significant skills. The learning paradigm of ABA is skill based and involves reinforces to help shape behaviors. Teaching method is directive and passive. ABA is generally applied by outside interventionists. Works well in teaching certain strategies. But parents found children having difficulty in generalizing the skills in new situations. Generalizing requires dynamic processing. Social competence and adaptability are difficult to teach in skill – based intervention.

RDI is not focused on eliciting particular behavior or teaching discrete skills. This intervention indeed helps in building ***"mindfulness"*** in the individual. Mindfulness is the ability to thing in flexible and fluid ways. Method used in RDI is ***"guided participation"*** or ***"coach apprentice relationship"*** between parent and the child. The challenge for parents of children with autism usually is in establishing the type of relationship in which the child is motivated to use parents as guides and the parent feels competent act as a guide.

RELATIONSHIP CURRICULUM ACCORDING TO RDI:

RDI is composed of *six levels* and **24** stages. Each level turned into four stages. Each of six levels represents a level represents a dramatic developmental shift in the central focus of relationship. The levels are;

Level-1: Novice

Level-2: Apprentice

Level-3: Challenger

Level-4: Voyager

Level-5: Explorer

Level-6: Partner

GOALS OF RDI:

The claims made for RDI are extraordinary by following the system; parents can expect their children to develop in these areas.

- Dramatic improvement in meaningful communication.
- Desires and skills to share their experience with others.
- Genuine curiosity and enthusiasm for other people.
- Ability to adapt easily and go with the flow.
- Amazing increase in the initiation of joint attention.
- Powerful improvement in perspective taking and theory of mind.
- Dramatically increased desire to seek out and interact with peers.

GETTING STARTED WITH RDI:

- Change your communication (e.g. asking fewer questions)
- Slow down the pace of daily activities and create more opportunities for "productive uncertainty"
- Spend time doing enjoyable experienced while sharing activities.
- Use memory books everyday to reflect on a few happy moments.

Thus, relationship development intervention shows greater improvement in social interaction and communication as well as greater increases in independent functioning in educational setting.

REVIEW OF LITERATURE

In a randomized trial done by ***Bridget M. Kuchn, JAMA 2011*** shows that ***early intervention curriculum supplemented with curriculum emphasized social communication therapy shows improvement in social behaviors***. The author had taken 50 toddlers with ASD and conducted therapy sessions in two groups where the samples were distributed randomly. One of the groups was undergoing conventional therapy and the other with supplemented therapy along with conventional therapy. The results of the RCT trials proved to improve the social behaviors of the experimental group such as emotional sharing, joint attention and imitational play. Thus, this study emphasizes importance of supplemental therapy in treating children with ASD.

In a pilot study by ***Catherine Aldred et al in the year 2008***, ***"A new social communication intervention for children with autism: pilot RCT study"*** suggesting effectiveness, in the ***Journal of Child Psychology and Psychiatry***, says that psychosocial treatments are the main stay of management for autism. But there is a notable lack of systemic evidence base for their effectiveness. The investigators randomized ***28 children*** into two groups to receive a new theoretically based social communication intervention targeting parental communication along with routine care and, routine care alone for the other group. Six months sessions were consolidated to two months sessions and the follow-up care was done after twelve months with outcome measures measured using standardized instruments. ADI, ADOS, Vineland Adaptive Behavior Scales were used. The results were significant when compared with controls. Thus this study suggests significant additional treatments benefits following a targeted a non – intensive dyadic social communication treatment is better when compared with routine care.

Schertz and Odom published ***"Promoting joint attention in toddlers with autism: A parent mediated developmental model" in 2007 September***. Joint attention, the foundational non-verbal social communicative milestone that fails to develop naturally in autism was promoted for three toddlers for early identified autism through early parent mediated, developmentally grounded, researcher guided intervention model. A multiple baseline design compared child performance across ***four phases*** of intervention: focusing on faces, turn taking,

responding to joint attention and initiating joint attention. All toddlers improved performance and two showed repeated engagement in joint attention, supporting the effectiveness of developmentally appropriate methods that build on the parent child relationships. A complementary qualitative analysis explodes challenges parent resilience and variables that may have influenced outcomes. ***Intervention models appropriate for toddlers with autism are needed as improved early identification efforts bring younger children into early intervention services***.

In a study done by ***Amy. M. Wetherby et al,*** in the year ***2007***, ***"Social communication profiles of children with autism spectrum disorders late in the second year of life"***, the main objective was to prove that social communication deficits to be as core deficits in autism spectrum disorders. In this study, the researchers had examined the social communication profiles from the behavior samples videotaped between 18 and 24 months of age. They have compared 3 groups of children – 23 samples of developmental delays, 50 samples of ASDs and 50 in typical developing children. The findings suggests that by 18 to 24 months of age there are five core social communication deficits are suggestive in ASD – gaze shifts, gaze / point follow, rate of communicating, acts for joint attention and inventory of gestures. Thus these pivotal skills are markedly affected in ASD compared to other two groups. These pivotal skills may be critical targets to consider in early intervention to enhance social communication. ***Thus the outcome measures through 14 scales suggest the early intervention is required in autism which reduces the neuropathology.***

Gutstein SE et al, in the year ***2007***, ***"Evaluation of the relationship development intervention program"***, says that to address the unique deficits in ASD – a need for effective parent based approach is important. RDI is a parent-based, cognitive developmental approach where care-givers are trained to provide daily opportunities for successful functioning in increasingly challenging dynamic system. This study is the review of the progress of 16 children who received RDI between 2000 and 2005. Individual effectiveness of the model was assessed in each child in a separate time span. Changes in the ADOS (Autism Diagnostic Observation Schedule) showed the good outcome measures in social interaction (verbally or non-verbally), flexibility when compared with prior treatment. ***The results proved that while all children met ADOS / ADI – R criteria for autism prior to treatment, no child met the criteria after follow-***

up. Since limitations are reported to lack of control or comparison group, emphasize on further research is specified to have constraints on age, IQ, parent self selection and education.

In another study ***Benedict, Christine S.*** in the year ***2007***, ***"Communication intervention for children with autism, a literature review"***, says that identifying the most effective intervention approaches for promoting language acquisition and supporting the development of communication skills in young children with autism is important. This reviews the existing literature in communication interventions and approaches. Strategies for teaching language are examined in relation to communication interventions. Behavioral and interactive approaches are examined to identify recommended programs and communication techniques. Though many communication interventions exist to increase their language and communication skills, it would appear that using several techniques and strategies in a combined approach might have greater utility than using a solitary intervention strategy. ***Thus the study suggests effective holistic interventions to improve and analyze the baseline skills.***

In the study by ***Solomen*** et al ***2007***, parents of children with autistic spectrum disorders were trained using the DIR/ floor-time model of Stanley Greenspan MD. 68 children completed the 8 to 10 days program. Parents were encouraged to deliver 15 hours/ week of 1:1 interaction. Pre or post ratings of videotapes by blind raters using the Functional_Emotional Assessment Scale (FEAS) showed significant increase ($p < 0.0001$) in child subscale scores. Translated clinically, 45.5% of children made good to very good functional progress.

In another retrospective study by ***Charman and colleagues*** in the year ***2007***, reported that ***suggestive slowed social and communication development between 14 to 24 months has been examined***. In the emphasize for urgency to determine whether very early intervention could alter the course of autism. Thus the findings through the outcome measures supports that early and social and communication plays a major role in prognosis and community acceptance, efforts to alter the severity of these aspects of the disorder should be made as early in life as possible.

In another study by ***Karen Toth*** et al, ***(2006)*** was on ***"Early predictions of communication development in young children with autism spectrum disorder: joint attention, imitation and toy play"*** in which the authors had investigated the unique contributions of joint

attention, imitation and toy play to language ability and rate of development of communication skills in young children with ASD. 60 preschool children were assessed using standardized measures. All the skills were needed to develop pro-declarative communication by 3-4 years and toy play as best predictors of communication by 4-6.5 years. The results shed light on the relationship between early skill domains and the development of language and communication in young children with autism and suggest specific targets for early intervention. Thus these skills appear to be important for setting the stage for early language learning in autism. Each of these skill areas represents an important target for early intervention programs that promote communicative competence and improved outcomes for young children with autism.

In a validity study done by ***Milke South*** et al, in the year ***2006***, examined the validity of ***GARS – 2***. 119 children with strict diagnosis of autism were used to validate the outcome measure to be used in research settings. Autism quotient hypothesized likelihood of autism. The sensitivity was reported to be good and markedly used in the research settings. The components had good internal consistency compared to the standardized scales. Thus, ***this scale was supported to be used in both clinical and research settings.***

In the study ***"A controlled trial of a training course for parents of children with suspected ASD" (McConachie H et al, 2005)***, the objective was to evaluate a training course for parents designed to help them understand ASD and to facilitate social communication with their young child. It was a controlled trial for 51 children aged 24to 48 months, whose parents received either immediate intervention or delayed access to the course. Outcome was measured 7 months after recruitment in parent's use of facilitative strategies, stress, adaptation to the child; and in children's vocabulary size, behavior problems and social communication skills. Taking into accounts scores at recruitment, child's level of ability, diagnostic grouping and the interval between assessments, a significant advantage was found for the intervention group in parents observed use of facilitative strategies and in children's vocabulary size. The training course was well received by parents and has a measurable effect on both parent's and children's communication skills.

In another study done by ***Gerald Mahoney*** et al ***2005*** compared the effects of relationship focused early intervention on toddlers and preschool age children who were classified as having PDD and developmental disabilities. Sample of 50 children were taken and

distributed as 20 in PDD and 30 in DDs. Intervention was conducted for a period of 1 year through weekly individual parent child sessions. The therapy focused on helping parents use responsive teaching strategies to encourage their children to acquire the pivotal skills of social interaction and communication which lead to have good developmental outcome. Comparatively to DD group the PDD group has greater effect in developing the cognitive, communication and socio-emotional functioning due to the treatment program. Thus ***the study emphasizes new interventions and recommends parent involvement in therapy sessions to get effective outcome.***

In a study done by ***Holmes*** et al ***1982***, parents view about acting as co-therapist in a home based behavioral treatment for their autistic child were investigated. Three areas were studied: (1) the demands involved in being a co-therapist, (2) whether parents felt more able to cope with their child after treatment and (3) whether they had the same conception of the treatment aims as did the therapists involved. Parents viewed their treatment more favorably than a comparison group of parents receiving more usual forms of treatment. Most had an accurate impression of treatment but half found it hard to use the methods suggested. Although parents felt that their child improved as a result of treatment, several had stopped using the techniques or felt unable to apply them to new problems.

CONCEPTUAL FRAMEWORK

Relationship competence requires a careful, systematic layering of skills. They must be taught with increasing complexity carefully added. Each step we take in constructing relationship competence, serves as the scaffolding for the next step in a carefully crafted manner.

According to ***psychosocial frame of reference*** by ***Laurette. J. Olson***, each child is born with an innate temperament that may help him/ her in establishing a secure environment and attachment relationship with his or her care-givers. Care-givers should understand the temperament present innately. Care-giver, knowing the child's personal style, should be able to interact in the way that child can facilitate his/her personal development. This provides a secure ***parent – child interactive environment*** and ***attachment***.

The quality of this primary relationship critically affects the ***development of coping, play and peer-interaction skills.*** As the child grows, it influences others. When the child is laid with strong foundation of developing this interaction level, it is likely to have increased competence to maintain family and peer-relationship. This fosters an increased desire to master more developmental tasks. The ability to play is directly related to the ability to work.

Temperament, attachment, peer interactions, play, ability to cope and environmental interactions are the central issues in the development of good mental health that deal with pediatric psychosocial disorders. All these facets are interconnected in a growing child and since they facilitate or hinder overall developmental progress reciprocally; they cannot be separated out in practice.

Rather than providing instruction in skills, ***Gutstein*** says that ***RDI*** is designed to engage the child with a parent in on-going interactive ways, which are fashioned to follow a progressive developmental path.

Application to practice focuses on addressing the mentioned complex issues in an integrated way. Thereby, when the therapist attempts to improve ***parent – child activity interaction***, he or she must consider and address the parent's understanding of the child's temperament and the adequacy of their mutual environments. Therefore, therapist may use play as a method to facilitate positive parent and peer-child interaction, fostering more adaptive

behaviors in the external environment. Henceforth, the therapist's interventions influence many aspects of children's psychosocial functioning.

Occupational therapists have traditionally recognized the importance of environmental influence on different aspects of a ***child's development and skill acquisition***. Research has demonstrated that when the child's development is challenged by a medical condition, disease or disability, the ultimate outcome is highly influenced by the care-giving environment (Sameroff, Chandler 1975).

According to acquisition frame of reference by Charlotte Brasic Royeen, all behaviors are shaped by the environment. It is the role of therapist to shape the environment according to the child's behavior. Exposure to environmental stimuli provides children to acquire new skills. ***One critical aspect of environment is the therapist***. They set the tone of intervention. ***Roger's statement of unconditional positive regard*** is used as a platform for all intervention. The therapist accepts the child unconditionally and without judgment. Thus, environmental competence strengthens the acquisition of skills.

According to Gutstein 2002, the guided participation and pacing of all the activities according to the child's likes and dislikes ends with adaptive response.

The investigator has based on the current study on the following concepts.

- Therapists and care-givers (parents) play an equal role in training children with ASD
- Usage of unconditional positive regard
- Guided participation and pacing of activities
- Play as the method to facilitate positive relationships and foster adaptive skills
- Environment to be, the platform for the intervention, to elicit spontaneous response.

METHODOLOGY

Research Design:

A two group pre-test and post-test quasi-experimental design is used in this study, to find out the effectiveness RDI based OT intervention by comparing the pre-tests of two groups. Each group consisted of 6 samples.

Test Area:

	Time period – I		Time period - II
Experimental	Level of performance		Level of performance
Group	before treatment (X)	→	after treatment (Y)
Control	Level of performance		Level of performance
Group	before treatment (Z)		after treatment (A)

Treatment effect = (Y-X) – (A-Z)

Variables:

The independent variable in this study is relationship development intervention based occupational therapy intervention. Dependent variables are child's social interaction and communication as measured by ***GARS -2.***

Setting and Duration of the study:

The study was conducted in ***KMCH Occupational therapy department, Coimbatore***. The duration of the study was one year. Intervention lasted for ***2 to 3*** months.

Sampling Technique:

Purposive judgmental sampling technique is used.

Participants:

Selection Criteria:

- **Inclusion Criteria:**
    - Children diagnosed as autism according to DSM-IV criteria or by a psychiatrist
    - Children of both the sexes
    - Children aged 2 to 5 years
- **Exclusion Criteria:**
    - Children other than ASD such as ADHD, Asperger's syndrome, PDD-NOS, SPD, Rett's syndrome, Childhood disintegrative disorder, seizure disorder, severe behavioral problems.

Measure:

Gilliam Autism Rating Scale – 2:

This is a ***norm – referenced instrument*** that assists clinicians in identifying and diagnosing autism in individuals. It estimates severity of the disorder. GARS – 2 can be administered in ***5 – 10 minutes***. The assessment consists of 42 clearly stated items, grouped into 3 subscales:

- **Stereotypical behaviors**
- **Communication**
- **Social interaction**

It was administered on a representative sample of 1107 persons with autism from 48 states within the U.S. The psychometric properties of GARS – 2 are,

Internal consistency – 0.88 to 0.96; subscales - stereotypical behavior – 0.84; communication – 0.86; social interaction – 0.94.

Co –relation coefficient and concurrent validity are good

Test – retest reliability is 0.88 for autism quotient

Sensitivity – 0.85

Procedure:

- The informed consent was taken from the parents and head of the department of Occupational Therapy, KMCH.
- Selection of the subjects was according to the selection criteria. Subjects were allotted to control and experimental groups respectively.
- Variables were subjected to the base – line evaluation which was done using ***GARS – 2.***
- Subjects in the control group underwent the conventional treatment and the experimental group received ***RDI based OT intervention*** along with the conventional therapy for the same time period.
- Then the outcome measure was calculated from both groups respectively.
- The data were then statistically analyzed through standard statistical method – ***SPSS version 17.***

RDI based OT intervention:

This is the systematic intervention with an invitational model. In this model, the participants in the initial level are the child, therapist and co-therapist (care–giver). The tested guides of the child should know certain principles and techniques. Techniques such as ***'guided participation'*** – guiding the child in a controlled fashion and ***'pacing'*** – adjusting our elements of behavior according to the child's need. Principles were,

- To learn the critical tips and techniques
- To act according to the child's response
- Providing non – distractive environment
- ***'Play'*** – as the choice of intervention
- To train parents to continue to develop communication

Language Pattern:

- Caregivers were taught to use certain bubbly words to attract the child throughout the game
- Voice intonation was maintained according to child's response

Intervention:

Goals: 10 goals were set.

- Face to face emotion sharing
- Understanding adult's facial expression
- Getting comforted by adults
- Referencing and anticipating adult's response
- Orienting to people and entering the proximity
- Primary excitement to novel situation during play/activity
- Shifting attention to find cues and to communicate positively
- Understands and enjoys structure of simple games
- Anticipating outcomes and face to face smile at appropriate times
- Enacting simple role actions and initiating turn – taking

Preparatory phase:

There were seven games set in these **24 sessions**. Initial **3 sessions** were making the child orient to environment and accept the therapeutic play.

Game Phase:

In the **24 sessions** the next phase consisted of **21 sessions** of games. The games were,

- 'Start……Stop'
- 'Attack, attack, attack……'
- 'Zoom, zoom, zoom…….zoom it'
- 'Go round, round & round……..'
- 'Go…Go….Go…….Goal'
- 'Big bubble, small bubble……'
- 'Tossing the loly – pups……' 'My turn'

Method of play varied according to the child's response, likes and dislikes with the play toys. Initially child was allowed to be a passive observer, then as participant along with the therapist and involves the co – therapist as play – partner.

DATA ANALYSIS AND RESULTS

In this study, the data was collected on four variables using the GARS – 2. Data were collected before and after the intervention. The data were subjected to statistical analysis by the Statistical Product and Social Sciences (SPSS) – 17th edition. The calculations were carried out in the following methods.

- Comparison of pre-post tests scores of each group was done by Wilcoxon – Signed Rank Test.
- Comparison of subscales of both groups was done by Mann Whitney Test.

TABLE – I: COMPARISON OF PRE – TEST AND POST – TEST SCORES OF EXPERIMENTAL GROUP OBTAINED IN GARS – 2:

S.No.	Groups N1 = 6 N2 = 6	Negative Ranks	Positive Ranks	Ties	Mean Ranks	Z – Value	Sig
1.	Post SB– Pre SB	6	0	0	3.50 0.00	-2.21	0.027
2.	Post C – Pre C	6	0	0	3.50 0.00	-2.20	0.028
3.	Post SI – Pre SI	6	0	0	3.50 0.00	-2.20	0.027
4.	Post AI – Pre AI	6	0	0	3.50 0.00	-2.20	0.027

SB – Stereotypical Behavior; C – Communication; SI – Social Interaction; AI – Autism Index

The above table shows the pre – post test values of experimental group which shows there is significant difference between the pre and post scores of all the four components [Stereotypical Behavior (SB) – 0.027; Communication (C) – 0.028; Social Interaction (SI) – 0.027; Autism Index (AI) – 0.027]. There are no positive ranks or ties.

TABLE – II: COMPARISON OF PRE – TEST AND POST – TEST SCORES OF CONTROL GROUP OBTAINED IN GARS – 2:

S.No.	Groups N1 = 6 N2 = 6	Negative Ranks	Positive Ranks	Ties	Mean Rank	Z – Value	Sig
1.	Post SB– Pre SB	6	0	0	3.50 0.00	-2.21	0.027
2.	Post C – Pre C	4	1	1	3.13 2.50	-1.36	0.174
3.	Post SI – Pre SI	3	2	1	3.33 2.50	-0.67	0.50
4.	Post AI – Pre AI	5	0	1	3.00 0.00	-2.03	0.042

SB – Stereotypical Behavior; C – Communication; SI – Social Interaction; AI – Autism Index

The above table shows the pre and post tests values of control group which shows there is significant difference between pre – post scores of stereotypical behavior and autism index (0.027 & 0.042) but there is no specific significance in the scores of communication and social interaction.

TABLE – III: COMPARISON OF PRE – TESTS AND POST – TESTS SCORES OF STEREOTYPICAL BEHAVIORS (SB) OBTAINED IN GARS – 2 OF CONTROL AND EXPERIMENTAL GROUPS:

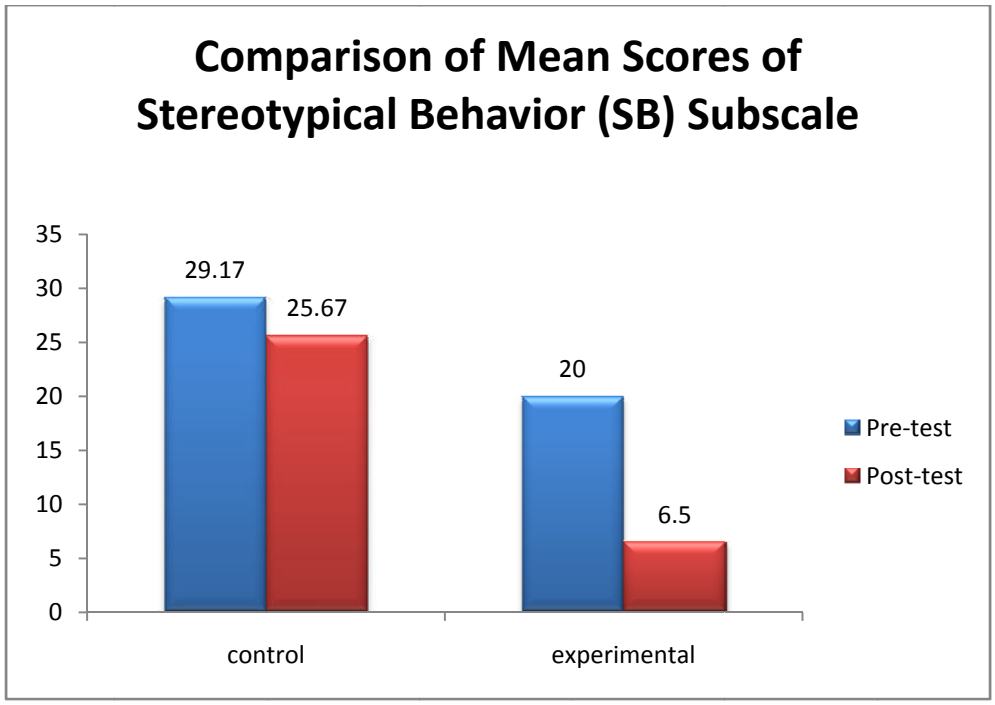
	Groups	Mean & S.D	Mean Rank	Mann – Whitney U	Z – Value	Sig
Pre – Test	Control	29.17 4.70	8.67	5.00	-2.08	0.037
	Experimental	20.00 6.84	4.33			
Post – Test	Control	25.67 7.73	9.50	-	-	-
	Experimental	6.50 3.14	3.50			

The above table shows the mean and standard deviation values of stereotypical behaviors in the pre and post tests scores of the control and experimental groups. The data in the table as well as compares the pre and post tests scores of stereotypical behaviors which interprets to have lower level of significance in the pre – test scores and there is significant difference in the post – test scores of both the groups.

TABLE – IV: COMPARISON OF PRE – TESTS AND POST – TESTS SCORES OF COMMUNICATION (C) OBTAINED IN GARS – 2 OF CONTROL AND EXPERIMENTAL GROUPS:

	Groups	Mean & S.D	Mean Rank	Mann – Whitney U	Z – Value	Sig
Pre – Test	Control	27.17 4.83	7.67	11.00	-1.125	0.261
	Experimental	24.33 4.76	5.33			
Post – Test	Control	24.33 2.94	9.50	0.00	-2.913	0.004
	Experimental	9.17 0.98	3.50			

The above table shows the mean and standard deviation values of communication in the pre and post tests scores of the control and experimental groups. The data in the table as well as compares the pre and post tests scores of communication which interprets to have no significant difference in the pre – test scores and there is significant difference in the post – test scores of both the groups.


Comparison of Mean Scores of Stereotypical Behavior (SB) Subscale
35
30
25
20
15
10
5
0
29.17
25.67
20
6.5
control
experimental
Pre-test
Post-test

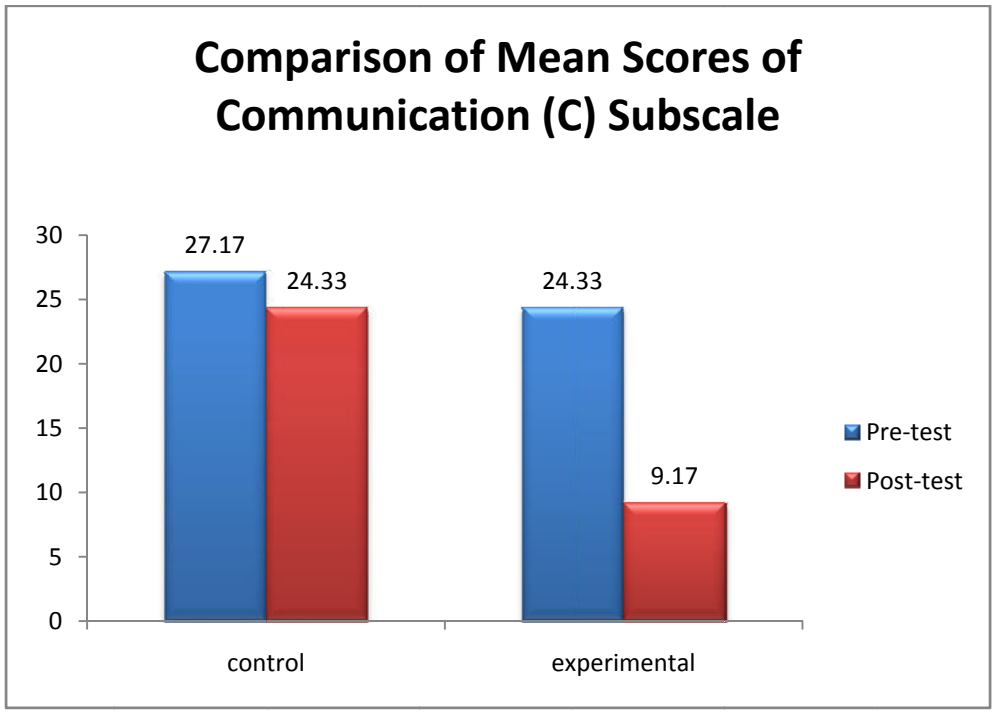

Comparison of Mean Scores of Communication (C) Subscale
30
25
20
15
10
5
0
27.17
24.33
24.33
9.17
control
experimental
Pre-test
Post-test

TABLE – V: COMPARISON OF PRE – TESTS AND POST – TESTS SCORES OF SOCIAL INTERACTION (SI) OBTAINED IN GARS – 2 OF CONTROL AND EXPERIMENTAL GROUPS:

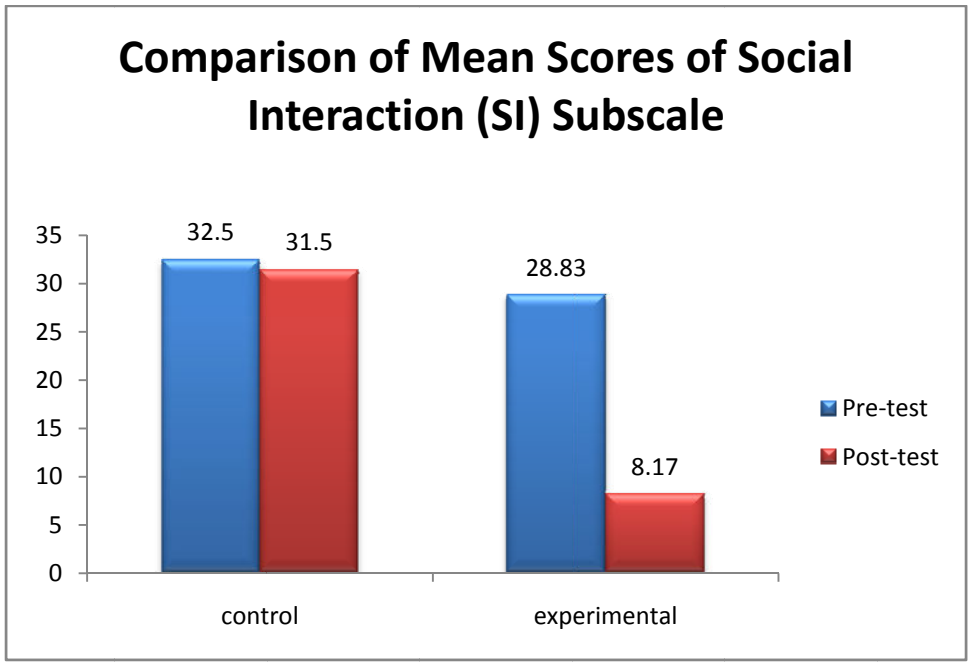
	Groups	Mean & S.D	Mean Rank	Mann – Whitney U	Z – Value	Sig
Pre – Test	Control	32.50 1.96	7.58	11.50	-1.050	0.294
	Experimental	28.83 6.43	5.42			
Post – Test	Control	31.50 4.037	9.50	0.00	-2.892	0.004
	Experimental	8.17 2.31	3.50			

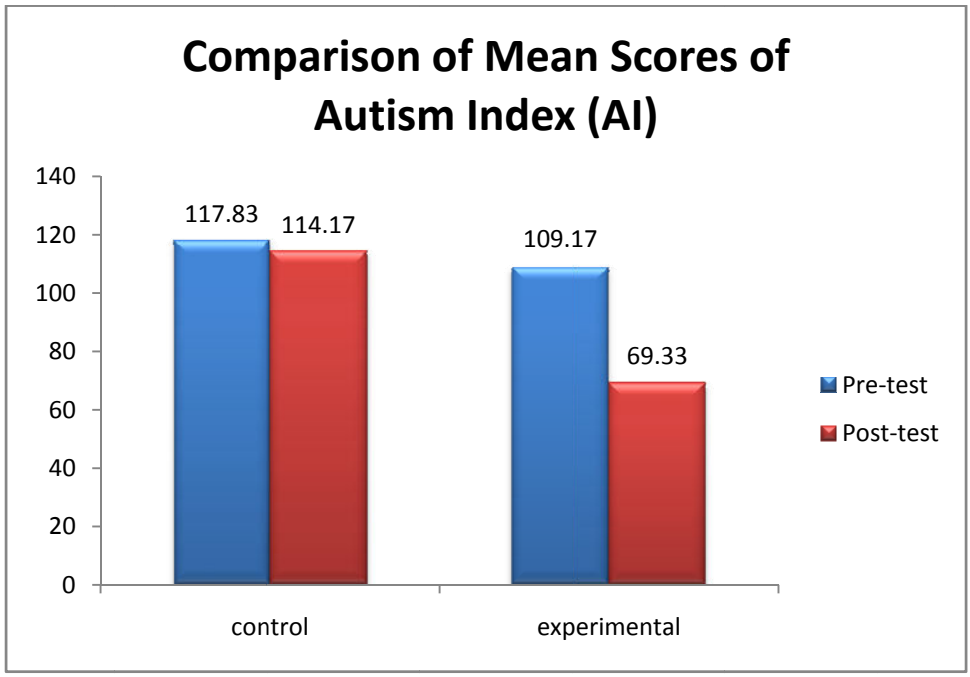
The above table shows the mean and standard deviation values of social interaction in the pre and post tests scores of the control and experimental groups. The data in the table as well as compares the pre and post tests scores of social interaction which interprets to have no significant difference in the pre – test scores and there is significant difference in the post – test scores of both the groups.

TABLE – VI: COMPARISON OF PRE – TESTS AND POST – TESTS SCORES OF AUTISM INDEX (AI) OBTAINED IN GARS – 2 OF CONTROL AND EXPERIMENTAL GROUPS:

	Groups	Mean & S.D	Mean Rank	Mann – Whitney U	Z – Value	Sig
Pre – Test	Control	117.83 6.08	7.75	10.50	-1.21	0.227
	Experimental	109.17 13.94	5.25			
Post – Test	Control	114.17 7.73	9.50	0.00	-2.90	0.004
	Experimental	69.33 3.50	3.50			

The above table shows the mean and standard deviation values of autism index in the pre and post tests scores of the control and experimental groups. The data in the table as well as compares the pre and post tests scores of autism index which interprets to have no significant difference in the pre – test scores and there is significant difference in the post – test scores of both the groups.


Comparison of Mean Scores of Social Interaction (SI) Subscale
35
30
25
20
15
10
5
0
32.5
31.5
28.83
8.17
control
experimental
Pre-test
Post-test


Comparison of Mean Scores of Autism Index (AI)
140
120
100
80
60
40
20
0
117.83
114.17
109.17
69.33
control
experimental
Pre-test
Post-test

DISCUSSION

Description of Subjects and Treatment:

Subjects were selected according to the selection criteria. The subjects were administered GARS-2 and allotted to control and experimental groups through purposive judgmental sampling method. Each group consisted of six subjects***. Amy. M. Wetherby et al. 2006*** had reported that pivotal social and communication skills developing late in the second year have a cascading effect on outcomes of children with ASD. Considering this crucial stage of development the inclusion of the subjects according to their age was from 2 to 5 years, where most of them in the control and experimental groups fell with the mean age of 33 and 35 months respectively. Though there were two female children in the control group but the severity level was comparatively the same as that of the experimental group.

	Control	Experimental
Male	4	6
Female	2	-
Mean Age	33 months	35 months

According to Scott Bellini et al, 2006 and IACC – 2003 has given hours of intervention in children with autism varied according to the severity. But, the prescribed hours of occupational therapy with parent training / involvement is around 4 to 5 hours per week. They had described in their review that the contribution of occupational therapists working with parents along with social skills showed more than 75% of contribution to growth. This current study also followed the above mentioned hours (3-4 hours per week).

With the support and emphasize of the above study, the subjects of the control group received only the conventional treatment such as Behavior Therapy, Sensory Integration Therapy, Acquisitional Therapy, Cognitive – training. The experimental group underwent both the conventional therapy and RDI based OT intervention. The duration of intervention lasted for 30 minutes of conventional therapy and 30 minutes of RDI based therapy. Parents were included as co-therapists in the session and follow – up practice was done at home.

According to Steven Gutstein 2007, RDI based intervention claims to be more effective for the children with autism of more than 2 years. This claims that the treatment

is appropriate to the specified age-group. According to Gutstein 2005, treatment would be effective only when child undergoes it for al least 30 months to cross 3rd to 4th level as specified in RDI. But the author emphasizes early detection and treatment will show marked improvement in the initial novice level. ***Thus, the therapy sessions in this study was planned for about 2 to 3 months.***

Initially, the language intonation principles and techniques were taught and emphasized to the caregivers. During the initial 3 sessions co-therapist acts as passive observer. Then the next 21 sessions were incorporated with games and active social play of the child with the therapist and care-giver. According to Gutstein 2002, active response in a spontaneous play helps the child to build and develop the dynamic intelligence. During the follow-up at home the participants of therapy would be the child along with the primary and secondary care-givers (parents) will take the role of therapist and co-therapist respectively. Thus, the critical tips were also taught to do the follow-up sessions. The sessions are described clearly in the methodology.

Discussion of the Tables:

Catherine Aldred et al. 2008 in their study done in RC trials have proved that there is significance in additional treatment, benefits following a targeted (but relatively non-intensive) dyadic social communication treatment, when compared with routine care. This supports the results of **table – I** which shows the significant difference comparing the pre-test and post-test scores of social interaction, communication, stereotypical behaviors and autism index in the experimental group. Thus, it proves the effectiveness of RDI based OT intervention.

In the **table – II** the results show that there is significant difference in stereotypical behavior scores (0.027), comparatively to the scores of social interaction and communication (0.50 & 0.174). This shows that the conventional therapy is more effective only in reducing the stereotypical behaviors where as it doesn't show much effect in improving social interaction and communication.

Comparing **tables I and II**, the RDI based OT intervention was effective in improving social interaction and communication and reducing stereotypical behaviors thereby reducing severity in autism index. Though the stereotypical behaviors have been reduced in both

the groups, experimental group shows a high improvement in social interaction and communication.

According to GARS – 2 the author says that reduction in the raw scores shows positive results in the study. Thus the **table – II (control group)** consists of positive ranks and ties in social interaction, communication and autism index. This shows that no notable improvements in the social communicative skills.

In the **table – III**, the comparison of stereotypical behaviors shows that there is significant difference at the pre – test level itself, so the post test scores were not compared. But when comparing the means in the pre-post tests there is notable difference found in the mean of post test scores of experimental group. (Control group mean – Pre-29.17, Post-25.67; Experimental group mean Pre-20.00, Post-6.50).

Rebecca Landa in 2007 in her review article emphasized that communication intervention for children with autism will envelop many aspects of development, including the entire pivotal social – communication skills. This supports the results of **tables – IV and V** which shows the significant difference in the pre-tests and post-tests scores of communication and social – interaction of control and experimental groups. Thus it proves that this exclusive adjunct therapy is effective in improving the social – communication skills.

In the **table – VI** the comparison of autism index scores of the control and experimental groups show that effective therapy will surely show significant reduction in the severity of autism and thereby it addresses the core – deficits of autism.

During the therapy sessions the researcher observed the following:

- The children were able to enjoy and share emotions with the play-partner.
- They were spontaneously maintaining eye – contact during the play with the play – partner.
- They were able to anticipate emotional response from the play such as sharing happiness, feeling of loss in the games.
- Report from the speech – therapist was that, the children were able to use appreciate words quickly and verbalize properly after the treatment.

- One child was able to listen to and follow the games within 2 to 3 sessions.
- The same child showed comparatively quicker response and better interaction than other subjects. He started verbalizing the bubbly words within 6th session and emotional referencing started within 10th session.
- Another child verbalized words clearly maintaining eye contact within 14th session.
- Another child took extra time to build rapport comparatively to other children.
- Another child initiated to verbalize the therapist's name and the clarity of verbalizing improved part by part throughout the sessions.
- Subjects were little irregular for the sessions due to sickness and lost grossly the continuity for a week's session, but the improvements made were retained.

LIMITATIONS AND RECOMMENDATIONS

This study has certain limitations that have to be addressed in future research. In this study the aim was to prove the effectiveness of RDI based OT intervention in autism as an early intervention. Though the study can't be generalized, its effectiveness is proved in the targeted population regardless of small sample size. Hence future research should have RC trails with a larger sample size.

Though the study didn't emphasize on the sensory impairment using any sensory profile, these impairments are meant to be associated features in autism. But a sensory profile can be used to analyze the outcome measure of sensory impairments before and after treatment which gives additional support to the study.

Though there was parent interview form which showed the outcome measure from the parent's perspective, being a caregiver involved protocol, a care-giver outcome measure will help to support the study in future research.

Emphasize on severity level and co – morbid features and sex of the children was very less which has to be recommended strongly.

Thus future research should follow the recommendations to have a generalization in the results of this study.

CONCLUSION

- This study concludes that ***RDI based Occupational Therapy intervention*** along with the conventional treatment shows ***remarkable improvement*** in developing ***social interaction*** and ***communication skills*** for children with ***autism***.
- It also reduces the stereotypical behaviors in children with autism.
- Thus, by addressing the core deficits at the early stage in children with autism, through this type of explicit adjunct intervention along with the conventional
- Henceforth, in this study ***RDI based OT intervention is proved to have better outcome measure in developing social interaction and communication skills for children with autism.***

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APPENDIX

PARENT TIPS TO WORK WITH THE CHILD

▪ Limit verbal communication and spotlight your facial communication.

▪ Communicate verbally only when the novice (Child) is watching your face.

▪ Use indirect cues when the Novice is not paying attention to your communication.

▪ Emphasize the excitement and fun of interacting over demands for interaction.

▪ Observe carefully to determine proper activity length and pacing.

▪ Observe carefully to determine objects that interface with social attention.

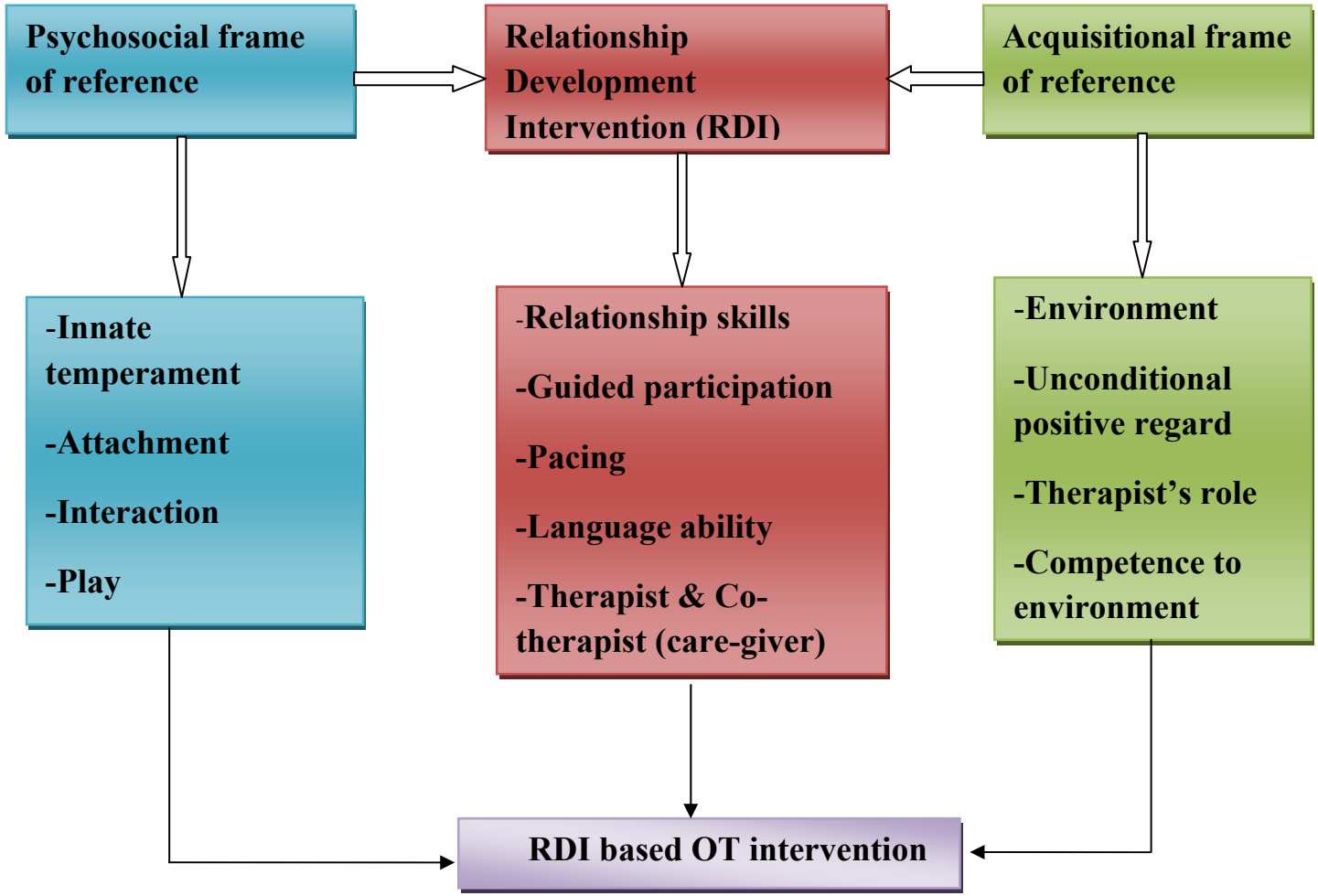
▪ Remain clearly in control of activities.

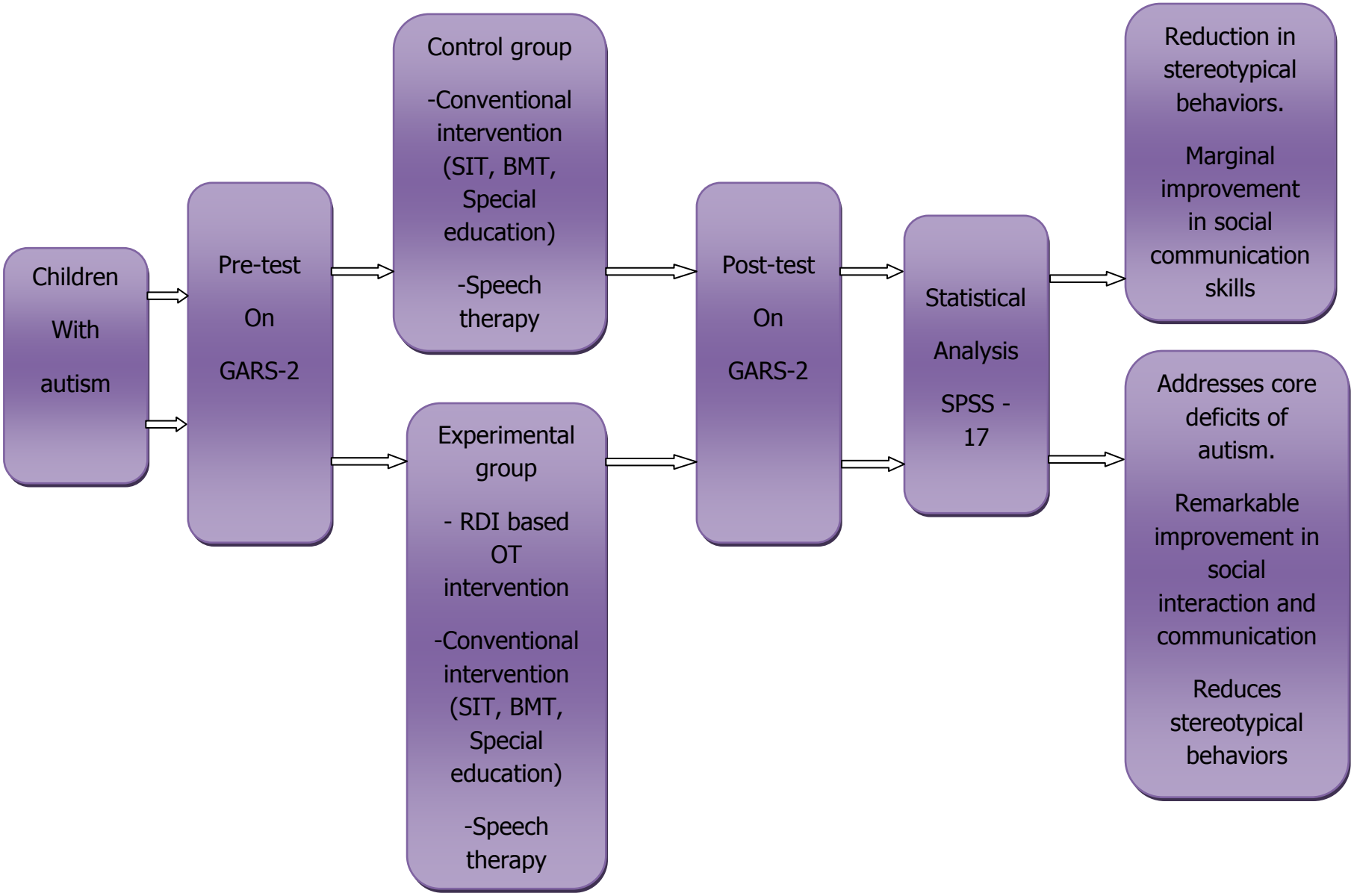
▪ Introduce sufficient unpredictability in your actions that the Novice is motivated to continue monitoring your actions whereabouts.

▪ Take frequent breaths to rest and provide an opportunity for the Novice to communicate with you.

Master Chart - Raw Scores of GARS – 2

S.No.	Sex	Age in Months	Base Line Evaluation				Outcome Measure			
			Stereotypical Behavior (SB)	Communication (C)	Social Interaction (SI)	Autism Index (AI)	Stereotypical Behavior (SB)	Communication (C)	Social Interaction (SI)	Autism Index (AI)
Exp1	M	31	15	18	29	100	6	10	8	68
Exp2	M	34	12	20	23	94	3	8	5	66
Exp3	M	39	22	24	26	109	7	9	8	68
Exp4	M	46	16	25	22	100	4	8	7	68
Exp5	M	32	25	29	36	124	7	10	9	70
Exp6	M	33	30	30	37	128	12	10	12	76
Con1	M	32	23	23	33	111	20	23	27	106
Con2	M	32	33	33	32	117	31	25	35	115
Con3	F	36	24	21	32	111	20	20	27	104
Con4	M	33	34	30	30	125	31	27	34	124
Con5	F	35	29	31	36	124	25	23	36	117
Con6	M	31	32	25	32	119	27	28	30	119


Psychosocial frame of reference
Relationship Development Intervention (RDI)
Acquisitional frame of reference
-Innate temperament
-Attachment
-Interaction
-Play
-Relationship skills
-Guided participation
-Pacing
-Language ability
-Therapist & Co-therapist (care-giver)
-Environment
-Unconditional positive regard
-Therapist's role
-Competence to environment
RDI based OT intervention


Children With autism
Pre-test On GARS-2
Control group
-Conventional intervention (SIT, BMT, Special education)
-Speech therapy
Experimental group
- RDI based OT intervention
-Conventional intervention (SIT, BMT, Special education)
-Speech therapy
Post-test On GARS-2
Statistical Analysis SPSS - 17
Reduction in stereotypical behaviors.
Marginal improvement in social communication skills
Addresses core deficits of autism.
Remarkable improvement in social interaction and communication
Reduces stereotypical behaviors